SMUD
SACRAMENTO MUNICIPAL UTILITY DISTRICT
The Power To Do More.SM
P.O. Box 15830, Sacramento, CA 95852-1830

August 26, 2004

California Energy Commission

Re: **Docket Nos. 03-IEP-01, 02-REN-1038, 03-RPS-1078, and 04-DIST-GEN-1**

Docket Unit, MS-4
1516 Ninth Street
Sacramento, CA 95814-5504

Attached are SMUD's written comments for use at the **Joint Committee Workshop and Availability of Accelerated Renewable Energy Development Draft Staff White Paper** to be held **August 27, 2004** as publicly noticed.

Questions concerning these comments may be directed to:

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Respectfully submitted,

H. BEEBE

H.I. Bud Beebe

ATTACHMENT

SMUD comments to CEC Draft Staff White Paper:
"**ACCELERATED RENEWABLE ENERGY DEVELOPMENT**", Dated July 30, 2004

The Sacramento Municipal Utility District (SMUD) staff respectfully submits written comments in response to the Energy Commission staff white paper titled "Accelerated Renewable Energy Development" dated July 30, 2004. We agree with much of the white paper, particularly the recognition that available and cost-effective transmission is needed from high value renewable energy resource areas, but we disagree with the staff recommendation that publicly-owned utilities should be regulated by the same eligibility and percentage requirements for renewables as investor-owned utilities. These brief comments provide SMUD's view on this issue.

1. Price Increases May Result for Publicly Owned Utilities but not for Investor-Owned Utilities.
   If publicly-owned utilities were required to meet a 20% renewables goal by 2010 statewide, there would be no "price cap" on renewables costs incurred to attain this goal. The state public goods surcharge creates a renewables fund that currently cannot be used by publicly owned utilities to pay "above market" costs, but it is used by investor owned utilities as a cap on their costs to meet the 20% goal. Publicly owned utilities also manage individual public goods accounts, but these accounts are used for energy efficiency, R&D, and low income programs in addition to renewable energy. The decision on funding allocations for these four public purposes are made in proportion to the local need, as determined by local governing authorities. Thus, the staff proposal would force publicly-owned utilities to either shift funds from one public value (e.g., low income, R&D or energy efficiency) to renewables (another public value) and/or to raise local rates to meet the 20% renewables goal even if the local community disagrees with this shift in priority. Even if a priority shift in local public goods expenditures is forced by a statewide mandate, it may be inadequate to achieve the 20% goal, resulting in a statewide increase in publicly-owned utilities (POU) rates, without an increase in rates of IOUs.

2. A Mandate to Cap Publicly-Owned Utilities Expenditures with their Public Goods Account Funds May Result in Less Renewables than Current Plans.
   In order to solve problem 1 above in an equivalent way as the IOU cap, a natural proposal would be to mandate a cap in the POU amount based on the renewables expenditures in their public goods account (e.g., for a specific year). However, many POUs such as SMUD are not limiting their spending in support of renewable energy purchases to the availability of public good charge funds, but are using general rate revenues to meet their RPS goals. Thus, a state mandate to POUs with a renewables cap limited to their public goods account could actually result in less renewable energy development by publicly owned utilities in California.

3. Renewables Mandates for Publicly-Owned Utilities Are Not Needed and May Stifle Innovation in Growing Renewable Energy Statewide.
   Publicly-Owned electric utilities represent public values in decision-making just as the State of California makes decisions in the public's interest. SMUD currently has one of the leading renewable energy programs in the United States. For example, the solar energy leadership began by SMUD twenty years ago has only recently found widespread adoption throughout the

State of California, and is now a major new initiative being proposed by Governor Schwarzeneggar in his "Million Solar Homes" program. Currently, SMUD is providing RPS innovation and leadership by allowing the eligibility of distributed generation renewables, and by including an "Emerging Technologies" component of its RPS in order to bridge a major gap between R&D programs and the market. These two elements of an RPS are not included in IOU programs governed by state regulations. Requiring publicly-owned utilities to meet statewide eligibility requirements may stifle this creativity and other innovations from publicly-owned utilities such as SMUD. Innovation and creativity should not be stifled by the state through "one size fits all" mandates. Attached to these comments is a recent status report of the renewable energy activities of SMUD, describing several leading, innovative programs that are not currently included in the mandated renewables programs of IOUs.

4. The Importance of Local Control. Local control is important to meet the "balancing" requirements between many local public values including electricity rates and support for low income, energy efficiency, R&D, and renewable energy. Publicly-owned utilities have elected Boards and other mechanisms to reflect and "balance" these local views for better local decision-making. As a detailed example, the attached SMUD renewable energy status report describes local policies adopted by the SMUD Board that strongly encourage accelerated renewable energy development, but also provide important boundaries that includes access to credit markets and maintaining competitive rates.

5. Unfair, burdensome Requirement for Small Publicly-Owned Utilities Resulting in Insignificant Statewide Results. Some small publicly-owned utilities may not have the load growth or ratemaking ability to finance and meet the 20% renewables mandate, potentially resulting in a very large and unneeded rate increase for ratepayers in these small POU's. In addition, the total of small POUs' contribution to a statewide 20% renewables goal is not significant to the development of substantial new renewable energy generation resources in California. The State of California should not create regulations that create big problems in small communities in order to achieve insignificant statewide benefits.

We look forward to presenting these views and engaging in the public discussion concerning specific questions raised by CEC Staff on Chapters 4 and 5 of the White Paper.

SACRAMENTO MUNICIPAL UTILITY DISTRICT

A NATIONAL LEADER IN RENEWABLE ENERGY

07/29/04

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The Power To Do More.®

1. Introduction

SMUD has been a utility industry leader in renewable energy development for the past twenty years. Through innovative solar, wind, geothermal, landfill gas, and run-of-the-river small hydro projects sponsored in the 1980's and 90's, SMUD has helped stimulate commercial development of renewable energy in California and has provided a foundation for the rapidly expanded growth forecasted for renewables in the 21st Century. Specifically, SMUD has provided national and international leadership in solar photovoltaics (PV) development beginning with the installation of the first large-scale photovoltaics utility plant (PV-1) at Rancho Seco in 1984. While considerable improvements have been made to PV systems during the past twenty years, this 1 MW facility today is still operating at 81% of its 1984 performance. SMUD's commitment to solar energy development has earned the Energy Globe Award, an international award for world leadership in sustainable energy.

The purpose of this paper is not to review the long history of SMUD's renewable energy activities, but to summarize the District's current policies, plans, and activities in renewable energy development. In summary, SMUD is continuing its renewable energy leadership in the utility industry with an expanded renewable energy program. While SMUD's aggressive solar energy program continues, the current SMUD renewable energy program has been broadened to include targeted renewable energy procurements, growing District ownership of wind energy projects, biomass development support and expanded purchases of geothermal energy. This expanded renewable energy program is now supported by a base of research, development, and demonstration projects that will continually improve and add value to the renewable energy activities of SMUD.

2. SMUD Policies and System Plans Related to Renewable Energy Development

a. Guiding Policies

The SMUD Board of Directors has been consistent in its support for the development and use of renewable energy. This consistent commitment is evidenced by the Board's Strategic planning process, conducted in public meetings throughout 2003 and 2004. The strategic policies and values developed under this process are guiding staff programs and actions. They include a series of Core and Key Values that provide strong support for the renewable energy activities of SMUD. Core values top the hierarchy and "…are strategically essential for the District." Key values "provide value-added services to SMUD customers and ratepayers."

Core values adopted by the Board address competitive rates, access to credit markets, reliability, customer service, environmental protection, and employee relations. Renewable energy activities at SMUD support all core values, but are particularly important in four areas addressing: (1) competitive rates (particularly in the mid- to long-term); (2) system reliability (primarily due to the diversification of supplies); (3) customer service (helping to meet a customer satisfaction target of 95%), and; (4) environmental protection (moving to cleaner generation based on renewable energy). It should be noted that the two core values

of maintaining competitive rates (in the near-term), and access to credit markets (increasing customer equity to 20% by the end of 2007) provide important financial boundaries to the renewables development activities of SMUD.

In July 2004, four key values were adopted by the Board. These are: (1) a preference for local benefits over global benefits; (2) reducing customer peak usage; (3) establishing renewables portfolio standard (RPS) goals of 10% renewables supplies by 2006 and 20% by 2011, and; (4) a preference for clean distributed generation, including continued leadership in solar power.

The adoption of core values and key values creates a strategic foundation for the expanded development of renewable resources.

b. Renewables Fit into the SMUD Electricity System

Electricity consumption in the Sacramento region is expected to grow at roughly 2% rate per year from 2004 through 2011. This growth can be met by planned increases in renewable energy supplies. Figure 1 shows both the forecasted load growth and the SMUD renewable energy commitment for this time period.

Figure 1. Total Direct Load and Renewable Supply Estimated Year

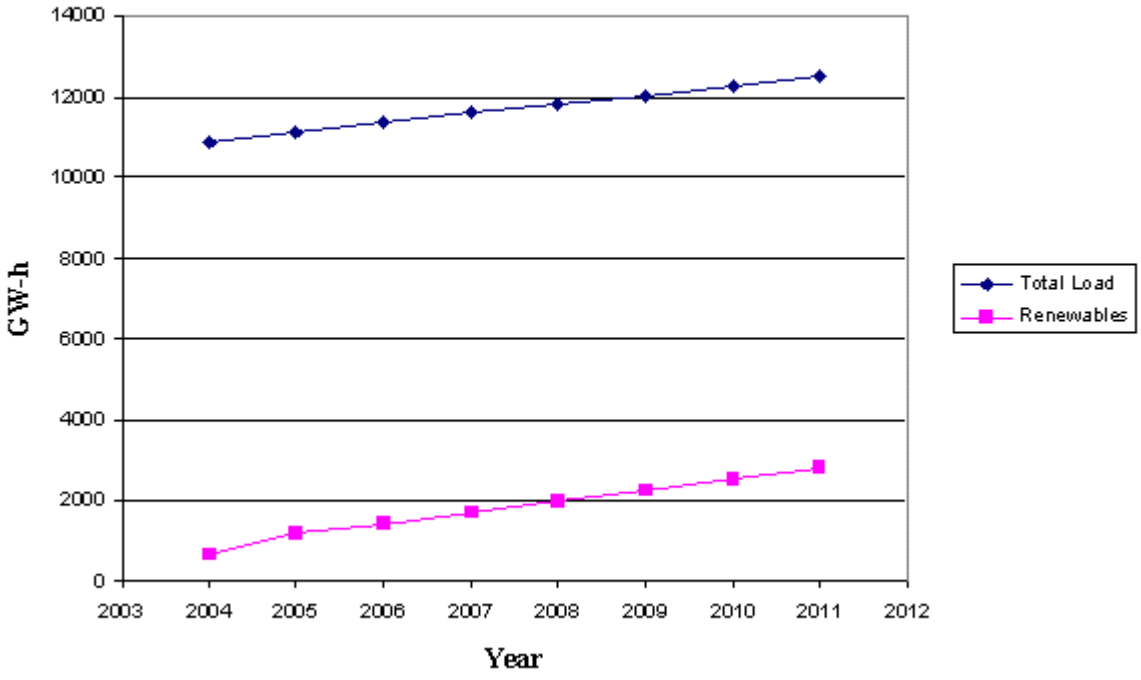
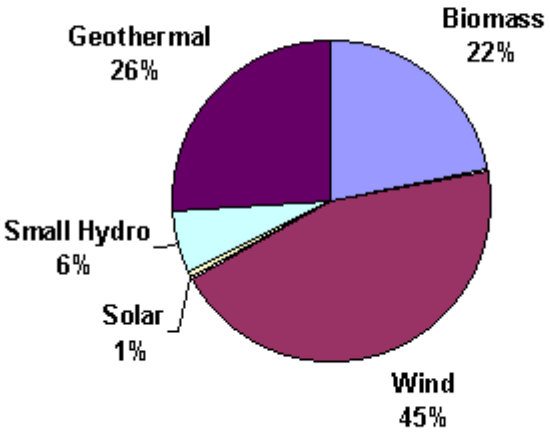


Figure 2, below, provides a current estimate of SMUD's expected renewable energy supplies in 2006 by renewable resource type based on the current (July 2004) procurement plans.

Figure 2. Estimated SMUD Renewables by Resource Type in 2006



In 2006, if large hydro renewable resources are included and SMUD has an average hydro production year, more than 40% of SMUD's electricity load will be met by clean, renewable energy, enhancing SMUD's reputation as one of the cleanest electric utilities in North America.

3. Current SMUD Activities in Renewable Energy

a. Specific Program Drivers for Renewables Growth

Two specific programs are driving the rapid growth of renewable electricity supply at SMUD, the Renewable Portfolio Standard and the Greenergy® Green Pricing Program. Energy accounting for these two programs is done separately for a variety of reasons, but primarily to avoid the appearance of double counting. Other technology-specific programs, such as the solar and biomass development programs, also are critical components of SMUD's renewable energy activities because they sustain long-term renewable energy growth and provide local benefits to SMUD customers.

SMUD Renewable Portfolio Standard

Approximately one year before state legislative mandates were passed to create a California renewables portfolio standard (RPS), the SMUD Board of Directors adopted Renewables goals of 10% of electricity supply by 2006 and 20% by 2011. These goals are significantly more aggressive than the current statewide goal of 20% by 2017.

SMUD Greenergy® Program

The Greenergy® Program was introduced in 1997 to support SMUD's goal of improving the environment and economic welfare of Sacramento and to address our customers' growing concerns about the environment and a need for healthy lifestyles. Greenergy® is offered to SMUD's residential and business customers, with over 26,000 program participants as of June 15, 2004.

The residential program continues to grow and is expected to increase enrollments by 25% in 2004 and another 20% in 2005. After astounding success in 2003 (1000% increase over 2002), the Commercial Greenergy® Program has already doubled enrollments in 2004, and is expected to grow by nearly 60% in 2005.

While the program grows at a fast pace, the Greenergy® Program team works diligently to ensure that Greenergy® remains a leading green-pricing program in the United States. In 2003, the National Renewable Energy Laboratory (NREL) again ranked SMUD's Greenergy® Program as one of the top ten programs in each of the four categories considered: total sales of renewable energy to program participants (kWh); total number of customer participants; customer participation rate; and the lowest price premium charged for a green pricing service using new renewable resources. The US EPA also recognized Greenergy® with a Beacon Award for Innovative Marketing in 2003 (Starbucks "Give a little get a latte" campaign).

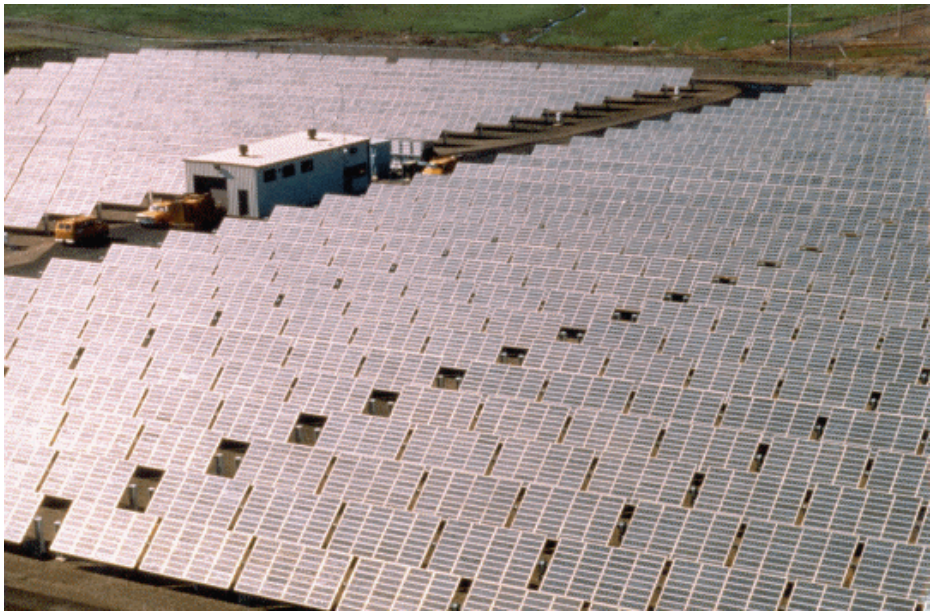
SMUD Renewables Procurements

Most of SMUD's future renewable energy needs, driven by RPS goals and Greenergy® revenues, will be met through competitive renewables solicitations. In June of 2004, SMUD released a broad solicitation in support of both programs. This solicitation is unique compared to other utility renewables procurements because, in addition to requesting conventional low cost wind and geothermal projects, the solicitation is designed to challenge the industry and encourage innovative, 'next generation' renewable energy proposals, including solar energy, biomass gasification, and other renewable technologies that have emerged from RD&D. These "emerging technologies" have not attained the production and "learning curve" benefits of "conventional" renewable energy technologies. However, SMUD believes that continued support of these advanced technologies is critical to the long-term growth of renewable energy supplies for California. SMUD will be receiving proposals for their renewable procurements during the second half of 2004, with the intent to initiate some contracts by late 2004 to early 2005.

b. Solar Program

With 10 Megawatts (DC) of grid-connected capacity installed in over 900 individual sites, SMUD has the nation's largest and most comprehensive utility-sponsored photovoltaics (PV) program. This program began in the mid-1980s with the completion of megawatt-scale arrays on SMUD's Rancho Seco property. These initial systems demonstrated the capability of utility-scale PV and helped build a knowledge base of technology pros and cons. Several arrays have been added to the Rancho Seco facility (both tracking and fixed-axis), with a total capacity now exceeding 4 Megawatts (DC).

Rancho Seco Aerial View



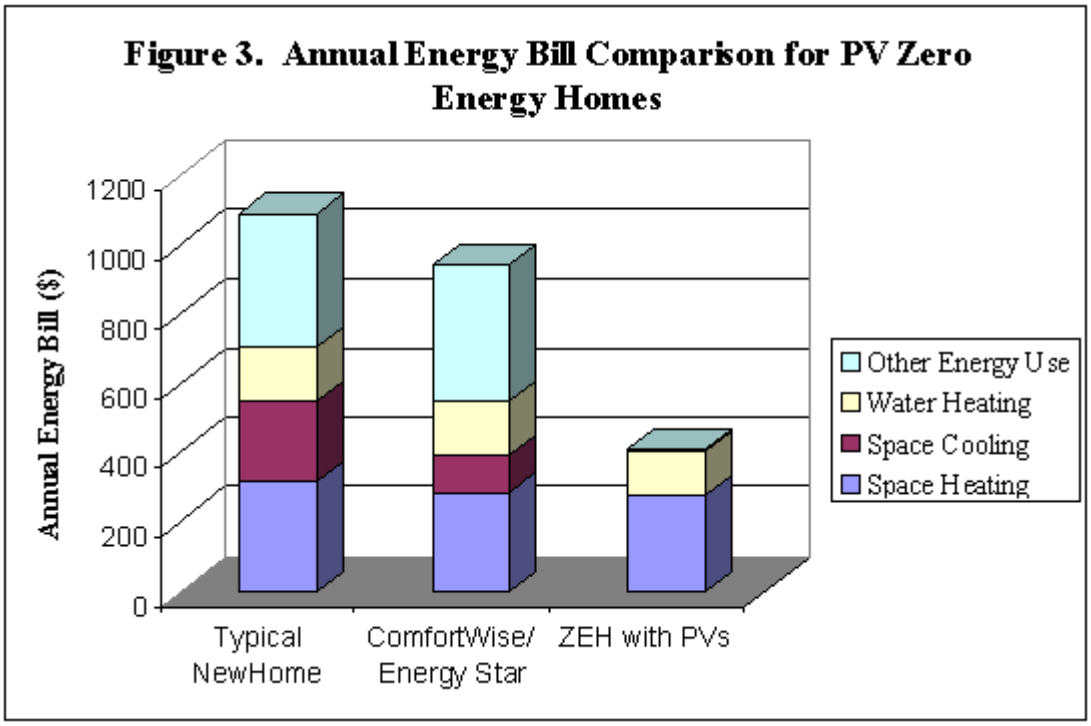
Rancho Seco Arrays

In the early 1990s, SMUD began work on the Hedge Substation facility. The Hedge plant is comprised of four primary arrays, with a total capacity of over 500kW.

Hedge Substation

SMUD recognized that the characteristics of the technology were ideal as a distributed generation resource within our community. The PV Pioneer program was initiated in 1994. Under this program, SMUD began placing small (2-30kW) PV systems on customer rooftops near the load center, or where the energy is consumed. The initial PV Pioneer systems were owned by SMUD (along with the electricity produced) to minimize technology risk to customers. As the technology has now matured, SMUD is selling PV systems to customers who own the electricity produced at retail rates through net metering. To date, the PV Pioneer program has installed over 5MW of grid-connected PV systems.

SMUD has active programs in both residential and commercial retrofit markets. SMUD has provided turnkey systems to customers at a substantially reduced purchase price, using local installation contractors. As the number of qualified local contractors has increased, SMUD has implemented a more market-driven approach, providing purchase incentives to participants who acquire PV systems from local contractors. SMUD offers a simple one-page interconnection agreement for residential customers and has streamlined the review process for systems up to 1 MW (SMUD's limit for net metering). Our net metering offer is the most generous of any utility in California, providing full retail credit that can be used to offset any portion of the electric bill over a 12-month annual cycle.



Recent opportunities for PV in the residential new construction market are very promising. Since 2001, SMUD has worked with nine area builders to introduce PV roofing tiles in their developments. The Premier Gardens project, which is being conducted in association with the DOE's Zero Energy Home (ZEH) Program, will incorporate a 2kW BIPV system and other energy efficiency equipment as standard features on all 95 homes in the development. The goal is to reduce energy costs by 60% for participating homeowners (see Figure 3 above and the photo below). As part of the Premier Gardens project, SMUD will be monitoring loads on the local distribution system to quantify the benefits PV can offer to an electric utility in terms of infrastructure costs. This is the second ZEH project in SMUD's service territory, and a third will be initiated in 2005.

Premier Gardens Zero Energy Home (ZEH) Program

b. Solano Wind Project

After the Montezuma Hills area of Solano County was identified as a Wind Resource Area (WRA) that offered a potential location for the future development of wind energy resources, SMUD acquired property in the area and initiated the first stage of the Solano Wind Project. The project is now a key component of the SMUD's long-range resource plan.

The Solano Wind Project is located on about 3,500 acres of SMUD-owned land approximately 15 miles southeast of Fairfield and Suisun and 4.5 miles southwest of Rio Vista. The project site is bounded on the south by the Sacramento River (see Figure 4 on next page).

Solano Wind Project

SMUD originally planned to produce 50 MW of wind power by constructing up to 181 wind turbine generators (WTGs) at the Solano Wind Project site. Due to lack of operational data, only 5 MW of the original turbines were built to minimize risk. The decision proved to be excellent because turbine failures limited electricity generation and operational costs soared. This was disappointing but the lessons learned were invaluable and the project demonstrated that the Solano site was an excellent wind-resource area. Rather than shy away from further investment in the project, SMUD began to redevelop the site. The original wind turbines have been removed and 23 modern WTGs were installed that produce 15 MW of wind power. SMUD plans to construct up to 66 new WTGs to generate 85 MW of new wind power, bringing the overall Solano Wind Project build-out to 100 MW. The 85 MW project included the recent purchase of an additional 192-acre parcel adjacent to the site's original southwestern boundary.

Wind turbine technology has improved and the wind industry has grown rapidly. New wind technologies have achieved greater efficiencies while harvesting wind energy using fewer, larger WTGs. The WTGs used in SMUD's first project each had a generating capacity of 330 kW. By comparison, the wind industry today is marketing WTGs up to 3 MW in size. WTG towers have changed from the shorter lattice towers used in the original project to taller and environmentally preferred tubular towers used in all later stages of the project. Tubular towers attract fewer birds and have, as a result, reduced avian mortality rates. The tubular towers are up to 410 feet tall. The WTG blades currently proposed for use at the site rotate more slowly and are significantly taller, increasing energy production. The rotor diameters are as long as 295 feet, creating windswept areas as large as 68,500 square feet.

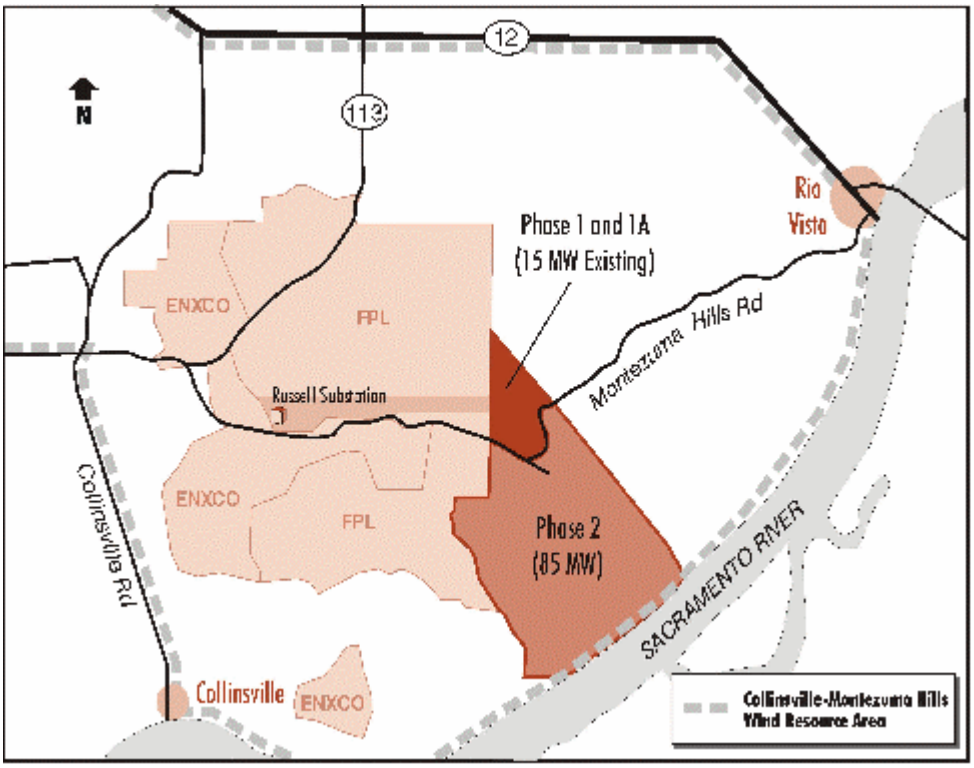


Figure 4. Solano Wind Project Build Out—Phase 2

The project will include the re-conductoring of interconnections to an existing substation and the construction of underground and overhead electrical and communications systems, an operations and maintenance facility, and entrance and service roads.

d. Biomass Development Plans

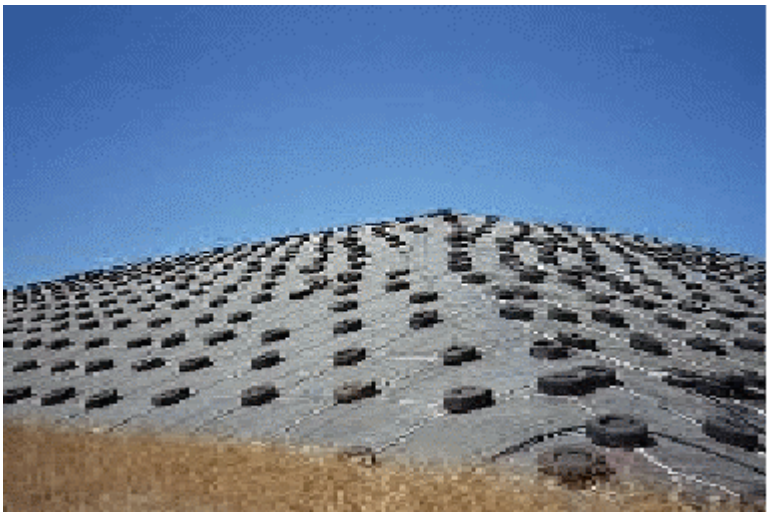
SMUD was an early supporter of biomass energy development. SMUD has been purchasing power from a publicly owned biomass facility in Washington for years and also purchases electricity from a local landfill. Currently, there is renewed interest in generating clean, cost-competitive electricity from biomass. Biomass is basically any organic matter that is available on a renewable or recurring basis, which can be converted to electricity by a variety of methods. SMUD's efforts are targeted at alleviating waste and residue problems, while resulting in local air and water quality improvements. Examples of local biomass resources are animal manure from dairies, orchard prunings, forest thinnings, food processing waste, green waste, urban wood waste, and municipal solid waste.

With a focus on identifying projects having local benefits, SMUD has embarked on activities that include a Regional Fuels Inventory, an assessment of commercially available biomass technologies, feasibility studies, and the development of a Pilot Dairy Digester Program. The Regional Fuels Inventory will determine the quality and quantity of local biomass fuels in Sacramento and seven contiguous counties.

Dairy Digester

Current practices for waste disposal will be determined. The goal is to match the high-quality, sustainable supplies of biomass fuel with conversion generation technologies capable of providing clean electricity. The regional inventory is already revealing opportunities that may result in biomass to energy projects in the future. For example, the Sacramento Regional Solid Waste Authority (SWA) is actively searching for local disposal methods for 200,000 tons per year of garden refuse collected by Sacramento County, the City of Sacramento, and the City of Citrus Heights. A potential opportunity exists to convert about half their total waste into biogas that can be used by a SMUD Cogeneration facility, replacing the equivalent of 10MW of natural gas with renewable fuel.

About 20% of the non-recyclable portion of Sacramento's municipal solid waste is currently being shipped to Nevada. Thus, there is an opportunity to develop or expand a landfill facility, which can convert this waste stream into methane and subsequently electricity. SMUD's involvement in the Yolo County Bioreactor Landfill R&D Project, has familiarized SMUD with the most advanced methods for efficient capture of methane for electricity.



Accelerated anaerobic digestion bioreactor at the Yolo County Landfill

The Regional Biomass Inventory project has identified thousands of acres of orchards that can produce a high-quality fuel, which, for example, can be used with modular gasification technologies. Forest thinning operations have begun in Southern California to reduce the risk of forest fires. SMUD will investigate the feasibility to convert the forest thinnings in Northern California to clean, renewable energy.

In parallel with the Regional Inventory, an assessment of biomass conversion technologies is being completed. UC Davis is researching mature technologies capable of converting biomass to electricity through thermal gasification, biological digestion, pyrolisis, and combustion. The focus of this project is to identify technologies that are mature, cost effective, and comply with environmental regulations. Feasibility studies will be performed on potential projects where a good match is found between biomass fuels and conversion technology.

One of the first opportunities for SMUD is the anaerobic digestion of animal manure. Sacramento has 43 dairies with over 14,000 milk cows. With anaerobic digestion, this amount of cow manure can generate 2 MW and 16,000 MWhrs of electricity annually. SMUD is offering incentives (13% of installed cost) to leverage significant levels of funding (25% of installed cost) from the US Department of Agriculture, making possible an approximate 5-year payback for dairy farmers. Five local dairies are participating in the Pilot Program, with potential to generate 5,000 MWhrs of renewable energy beginning in 2006.

e. Renewables Research, Development, and Demonstration (RD&D)

SMUD led renewables RD&D is ongoing in several key technology areas: photovoltaics, wind, and biomass. The primary goal of the RD&D is to increase the use of renewables for the Sacramento region. To date, this has been accomplished under the Renewable Generation R&D Program (the ReGen Program) in conjunction with a grant from the California Energy Commission (CEC) of about $13M. Co-funding from SMUD, participating R&D contractors, and other funding agencies, increases the program's budget to roughly $24M.

The ReGen Program manages 19 R&D projects. Almost all of the projects have been successfully completed or are nearing successful completion.

The ReGen Program was designed and implemented prior to adoption of renewable portfolio standard legislation, with the primary goal of assisting SMUD with its PV programs. As a result, the primary goals of the ReGen Program are to: (1) reduce the installed cost of PV; (2) develop new products that will broaden the market for PV; and (3) reduce SMUD's cost of delivering PV to its ratepayers. Among the program's nineteen projects, there are sixteen PV-related projects, two biomass projects, and one wind project. Within the PV area, twelve of the projects are developing new PV products and four are helping SMUD improve the delivery of PV to its customers.

The following is a partial list of the program's accomplishments to date. Other developments will be completed before the end of 2004. The accomplishments include:

- The only Building-Integrated Photovoltaic (BIPV) system currently being used in the residential new-construction market.
- A non-penetrating, non-ballasted mounting system for commercial-sector sloped roofs.
- A building integrated PV technology for use with standing-seam sheet-metal roofs.
- Product modifications that allow a manufacturer to produce its PV systems more economically.
- Development of the world's first wind turbine that will use multiple generators.
- A tilted mounting system for a PV product that was previously mounted horizontally on flat roofs.
- A software package that automatically allows SMUD to identify under-performing PV systems.
- An accelerated decomposition landfill project in Yolo County that greatly advances the state-of-the-art of landfill gas generation.

Several projects completed their primary objectives but did not continue to complete secondary objectives. As a result, the program has a significant amount of funds for rebudgeting to new projects. With the increased focus on renewable portfolio standards (RPS), the program's emphasis is changing. It will include proportionally more work on biomass, wind and cross-cutting initiatives, including:

- System cost and integration work that may enable SMUD to accept larger amounts of wind generation than is currently thought possible.

- Development and demonstration of new biomass technologies and products.
- The development of new PV products and technologies that will reduce the installed cost of PV in the near term.

4. Conclusion

SMUD continues to pursue its historical efforts to expand renewable energy supplies for its customers. Based upon the goals established by the Board during their recent Strategic Planning process, SMUD is pursuing an aggressive Renewable Portfolio Standard, a cutting edge green energy program, and facilitating the advancement of new renewable energy technologies through coordinated RD&D efforts.